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# U.S. DEPARTMENT OF AGRICULTURE

## *Office of Information*



Picture Story No. 78

For Release Dec. 3, 1950

### **FLAVORFUL ICE CREAM FROM BUTTERMILK IS THE RESULT OF USDA RESEARCH**



Extensive research by the U.S. Department of Agriculture has resulted in a method by which sweet-cream buttermilk can be used to make flavorful ice cream that has a richer or "creamier" taste than ice cream made with skim milk or other types of milk solids.

The new method, which was developed by the Bureau of Dairy Industry in one phase of a Research and Marketing Act study on the utilization of dairy by-products, is an example of science finding a new use for an old but nutritious product that is largely fed inefficiently to livestock or wasted outright.

Sweet-cream buttermilk is the product of churning sweet cream instead of sour

cream, and, according to present estimates, approximately 500 million pounds of it is produced annually in the United States. USDA dairy technologists say that this amount of buttermilk contains about 50 million pounds of valuable milk solids, primarily protein and lactose (milk sugar). Food nutritionists agree that the diets of the Nation's people would be improved by the more widespread use of these health-giving milk solids.

The quality of buttermilk ice cream depends largely on the quality of the buttermilk used to make it. D. H. Williams, manufacturing technologist for the Bureau of Dairy Industry, inspects freshly churned sweet-cream butter just before he draws off the buttermilk for use in the ice cream experiments.  
N-11312







Frank E. Potter, dairy manufacturing technologist, adds sweetened condensed buttermilk to the ice cream "mix" in the pasteurizer. The "mix" is then pasteurized by heating it to 160 degrees F. for half an hour.

Sweetened condensed buttermilk can furnish most of the milk solids and cane sugar that is required for making ice cream, and it also provides certain minor constituents of milk, including lecithin, which may be responsible for the improved flavor and whipping properties of buttermilk ice-cream. N-11313



After the ice cream "mix" is pasteurized and homogenized it is cooled immediately to below 40 degrees F. with a surface cooler. Here, D. H. Williams, dairy manufacturing technologist, reads the temperature of the cooled "mix." N-11314

Although sweet-cream buttermilk has been made since the early 1900's, it has not been used to any extent in human foods, mainly because suitable methods have not been available for satisfactorily preserving it for storage or shipping. Related research by the Bureau of Dairy Industry, however, has resulted in a method for preparing sweetened condensed buttermilk. This condensed product compares favorably with sweetened condensed skim milk in keeping quality and has been found to be an excellent form for preserving buttermilk for use in human foods.

In the Bureau's experiments, sweetened condensed buttermilk was substituted for sweetened condensed skim milk in the ice-cream "mix." The composition of the "mix" was: 12 percent butterfat, 10 percent milk-solids-not-fat, 15 percent sugar, and 0.25 percent stabilizer. The sweetened condensed buttermilk furnished 80 percent of the milk-solids-not-fat. Each experimental "mix" was pasteurized at 160 degrees F. for 30 minutes, homogenized at 2,500 pounds pressure, cooled to 40 degrees F., aged for 20 hours, and then frozen in either a batch- or continuous-type ice cream freezer.

Buttermilk ice cream was subjected to taste tests by a panel of taste experts and it was considered to be more flavorful and "creamier" in texture than ice cream made with skim milk. The dairy researchers found also that

they were able to obtain a higher "over-run" more easily when buttermilk solids were used in ice cream. "Over-run" is the increase in the volume of the frozen "mix" due to incorporation of air by whipping as the "mix" is frozen. A substance known as lecithin -- a fat-like constituent in milk -- was thought to be responsible for the improved whipping properties of the buttermilk ice cream "mix." Sweet-cream buttermilk often contains 4 or 5 times more lecithin than the milk from which it is derived.

Buttermilk derived from the churning of sour cream was used in some of the ice cream experiments. Objectionable flavors were distinct and the ice cream was judged unsatisfactory. Furthermore, the improved whipping properties of the mixes containing sweet buttermilk solids were not obtained when the solids were derived from neutralized sour cream buttermilk.

Several types of sweet-cream buttermilk were used with equal success in the Bureau's ice-cream experiments. The types that were used are: Fresh fluid, condensed, sweetened condensed, and spray-dried. Sweetened condensed buttermilk, according to Bureau technologists, would probably be preferred for commercial manufacture of buttermilk ice cream because it can be preserved easily for several months, and it is an excellent source of sugar for the ice cream "mix."



The buttermilk ice cream "mix" is rapidly frozen in a batch-type freezer until a stiff but soft ice cream is formed. During the freezing process air is whipped into the mixture to give the ice cream body and palatability. The frozen product should have about 90 percent "over-run," which means that the volume of the ice cream is nearly twice the volume of the "mix." The can of soft ice cream is placed in the hardening room where it hardens for several hours at a temperature of minus 15 degrees F. N-11315



Buttermilk ice cream has a delicious and appealing flavor when it is eaten right from the freezer. But whether eaten this way, or after it hardens, the ice cream has a distinct, creamy flavor all its own. Bureau of Dairy Industry technologists attribute this special creaminess to lecithin, one of the minor constituents of milk that remains in buttermilk when cream is churned. N-11316

8x10 glossy photographs of this series are available to writers and editors on request to the Press Service, Office of Information, USDA, Washington 25, D. C.

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